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May 18, 2004

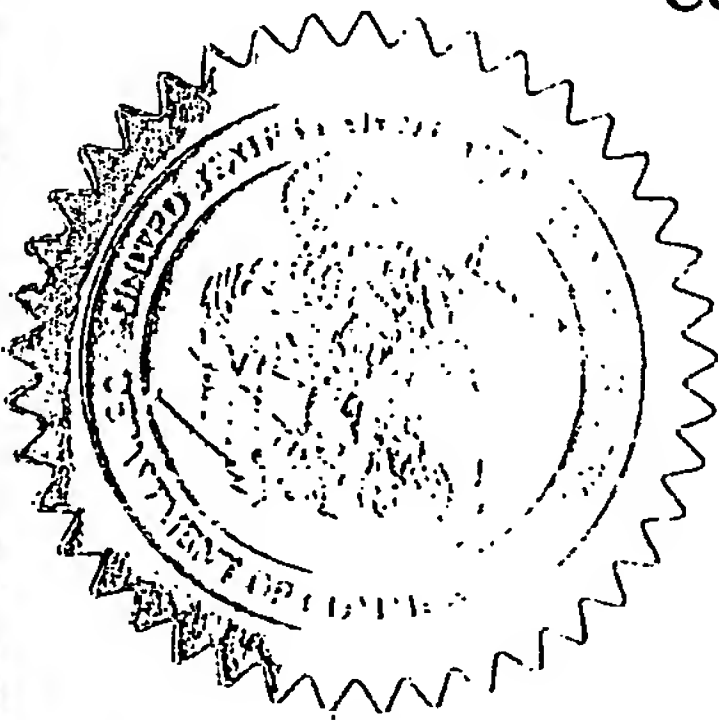
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APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A
FILING DATE.

APPLICATION NUMBER: 10/406,336

FILING DATE: April 03, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/09471

By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS



T. LAWRENCE
Certifying Officer

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04-04-03 10406336 040303

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PTO/SB/05 (03-01)
Approved for use through 10/31/2002. OMB 0651-0032
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

First Inventor

Title

Express Mail Label No.

Glenn Wakefield

Magnetically Propelled Capsule Endoscopy

EU88230355US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

- ☒ Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
- ☒ Applicant claims small entity status.
See 37 CFR 1.27.
- ☒ Specification [Total Pages
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table, or a computer program listing appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☐ Drawing(s) (35 U.S.C. 113) [Total Sheets
- Oath or Declaration [Total Pages
 - ☒ Newly executed (original or copy)
 - ☐ Copy from a prior application (37 CFR 1.63 (d))
(for continuation/divisional with Box 18 completed)
 - ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
- ☐ Application Data Sheet. See 37 CFR 1.76

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

- ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
- Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - ☐ Computer Readable Form (CRF)
 - Specification Sequence Listing on:
 - ☐ CD-ROM or CD-R (2 copies); or
 - ☐ paper
 - ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

- ☐ Assignment Papers (cover sheet & document(s))
- ☐ 37 CFR 3.73(b) Statement of Power of Attorney (when there is an assignee)
- ☐ English Translation Document (if applicable)
- ☐ Information Disclosure Statement (IDS)/PTO-1449
- ☐ Preliminary Amendment
- ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
- ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
- ☐ Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
- ☐ Other:

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)

of prior application No. _____

Prior application information:

Examiner _____

Group Art Unit: _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS

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or ☒ Correspondence address below

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State

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Telephone

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Fax

Name (Print Type)

Glenn Wakefield

Registration No. (Attorney/Agent)

Signature

Glenn Wakefield

Date

04/03/2003

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TITLE OF INVENTION

Magnetically Propelled Capsule Endoscopy

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT
DISC APPENDIX

Not Applicable

BACKGROUND OF THE INVENTION

This patent application applies to the field of medical imaging and tissue biopsy/excision.

Traditionally the digestive tract has been examined by the upper gastrointestinal endoscope and the lower gastrointestinal endoscope and most recently by the capsule endoscope. Upper and lower gastrointestinal endoscopy usually require an anesthetic and are limited by the inability to examine the small intestine. Capsule endoscopy does not practically allow for real time imaging and precludes tissue biopsy/excision. The upper and lower gastrointestinal endoscopy and capsule endoscopy provide a limited range of viewing/access angles.

BRIEF SUMMARY OF THE INVENTION

Magnetically propelled capsule endoscopy provides for the medical examination of the gastrointestinal tract. After the capsule is swallowed, it will be steered throughout the gastrointestinal tract by an externally generated magnetic field. This device will provide real time imagery and position data along with the ability to perform tissue biopsy/excision. This device can be applied to the gastrointestinal tract, reproductive tract, trachea/lungs, vascular system or any accessible body cavity.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

Not Applicable

DETAILED DESCRIPTION OF THE INVENTION

Magnetically propelled capsule endoscopy allows for a fast, comprehensive medical examination of the digestive tract, reproductive tract, trachea/lungs, vascular system or any accessible body cavity. The capsule is swallowed or appropriately placed in the body. Contained within the small capsule will be:

(#1 possibility) - magnets for movement and directional control; LEDs for lighting and camera for visualization; rf source and receiver to transmit pictures and to communicate;

gyroscope/accelerometer for positional information; mechanical equipment for tissue biopsy/excision or other procedures; power source; electronics;

(#2 possibility) - magnets for movement and directional control; fiber optic light source, fiber optic imaging lens, power lines, communication lines, air hose, and water hose extending out the back of the capsule and connecting to the external control instrument; gyroscope/accelerometer for positional information; mechanical equipment for tissue biopsy/excision or other procedures; electronics.

All of the parts in #1 possibility and #2 possibility, other than the magnets, will be composed of nonmagnetic material or magnetically shielded as required. The #1 possibility is a capsule with no physical connection to the outside in contrast to the #2 possibility that is a capsule that has a physical connection to the outside. The choice of physical connection or not, capsule size and capabilities will vary depending on the part of the body that is being examined by the medical practitioner.

The magnets contained within the capsule will be bathed in an externally generated magnetic field. The external field is created by inscribing six metal rings on the six faces of an imaginary cube. Current is running through each of the six rings which effectively allows a pair of rings to control each dimension. The metal rings are composed of many windings of appropriately coated wire. The patient undergoing the medical examination will be placed inside the six ringed

structure. The capsule will be moved by appropriately changing the current within each ring. As necessary, the actual rings will be moved in conjunction with the changing current. The medical practitioner, using visual feedback, will guide the capsule throughout the body part under examination. The magnetic field strength will be adjusted appropriately for direction change, movement or extra stationary stability for tissue biopsy/excision or other procedures.

The gyroscope/accelerometer will provide the ability to map in real time the positional progress of the capsule. A positional map will be created of the entire exam, areas of interest can be marked, and visual images will be generated corresponding to each positional location of the capsule. A computer generated three dimensional fly through can be created based on the data collected from the examination. All of this data can be appropriately stored for future reference and for comparison with other medical exams.

CLAIMS

I claim:

1. Magnetically propelled capsule endoscopy allows for a fast, comprehensive medical examination of the digestive tract, reproductive tract, trachea/lungs, vascular system or any accessible body cavity. The capsule is swallowed or appropriately placed in the body. Contained within the small capsule will be:

(#1 possibility) - magnets for movement and directional control; LEDs for lighting and camera for visualization; rf source and receiver to transmit pictures and to communicate; gyroscope/accelerometer for positional information; mechanical equipment for tissue biopsy/excision or other procedures; power source; electronics;

(#2 possibility) - magnets for movement and directional control; fiber optic light source, fiber optic imaging lens, power lines, communication lines, air hose, and water hose extending out the back of the capsule and connecting to the external control instrument; gyroscope/accelerometer for positional information; mechanical equipment for tissue biopsy/excision or other procedures; electronics.

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ABSTRACT OF THE DISCLOSURE

Magnetically propelled capsule endoscopy provides for the medical examination of the gastrointestinal tract. After the capsule is swallowed, it will be steered throughout the gastrointestinal tract by an externally generated magnetic field. This device will provide real time imagery and position along with the ability to perform tissue biopsy/excision. This device can be applied to the gastrointestinal tract, reproductive tract, trachea/lungs, vascular system or any accessible body cavity.

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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☒ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number

First Named Inventor

Glenn Wakefield

COMPLETE IF KNOWN

Application Number

Filing Date

Art Unit

Examiner Name

As the below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Magnetically Propelled Capsule Endoscopy
(Title of the Invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

Direct all correspondence to: ☐ Customer Number or Bar Code Label ☐ OR ☒ Correspondence address below

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]) Glenn Mark

Family Name or Surname Wakefield

Inventor's Signature Glenn Mark Wakefield

Date 04/03/2003

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ZIP 85283

Country USA

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])

Family Name or Surname

Inventor's Signature

Date

Residence: City

State

Country

Citizenship

Mailing Address

City

State

ZIP

Country

☐ Additional inventors are being named on the _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.